Exemption No. 6820

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of

Boeing Commercial Airplane Group

for an exemption from §§ 25.785(h)(2), 25.807(d)(7), 25.812(e), 25.813(e), 25.853(d), of Title 14, Code of Federal Regulations

Regulatory Docket No. 29253

PARTIAL GRANT OF EXEMPTION

By letter B-T113-98-3630, dated May 22, 1998, Mr. D. W. Berg, Manager, Certification, Delivery and Fleet Support, Boeing Commercial Airplane Group, P.O. Box 3707, Seattle, WA 98124-2207, petitioned for an exemption from the requirements of §§ 25.785(h)(2), 25.807 (d)(7), 25.812 (e), 25.813 (e) and 25.853(d) of Title 14, Code of Federal Regulations (14 CFR), to permit a distance greater than sixty feet between passenger exits, to not incorporate escape path marking inside of rooms, installation of interior doors between passenger compartments, flight attendant seats that do not provide direct view, and interior materials that do not comply with heat release smoke emissions requirements on a Boeing 737-700 Increased Gross Weight (IGW) airplane.

The petitioner requests relief from the following regulations:

Section 25.785(h)(2) - Requires that flight attendant seats be located to provide a direct view of the passenger cabin.

Section 25.807(d)(7) - Limits the distance between passenger emergency exits to sixty feet.

Section 25.812(e) - Requires floor proximity escape path marking to guide passengers to emergency exits.

Section 25.813(e) - Prohibits installation of interior doors in between passenger compartments.

Section 25.853(d) - Limits maximum heat release rates for large panel cabin interior materials.

The petitioner's supportive information is as follows:

"Petition for Exemption under [Federal Aviation Regulations] FAR 11.25, from Certain Parts of Federal Aviation Regulations governing the design of Transport Category Airplanes when the Airplane is to be operated under FAR Part 91 or Part 125.

"AIRPLANE MODEL: This petition is specifically proposed for the Boeing Model 737-700 IGW when it is configured for 'Private, not-for-hire use' and not offered for public conveyance.

"SPECIFIC RELIEF REQUESTED: It is requested that the identified Model Airplane be exempted from certain parts of:
"FAR Part 25.785 (h)(2) Requiring cabin viewing capability from attendant seats.
"FAR Part 25.807(d)(7) Stating a minimum distance between adjacent emergency exits.
"FAR Part 25.812(e) Providing lighting to guide occupants to emergency exits.
"FAR Part 25.813(e) Prohibiting internal cabin doors in emergency access routes.
"FAR Part 25.853(d) Requiring that cabin materials meet specific flammability standards.

"GENERAL BACKGROUND

"Federal Aviation Regulations, Part 25, provides rules governing the design and the certification requirements of Transport Category Airplanes which are generally considered to be Commercial Aircraft being operated by airlines under FAR Part 121 in the commerce of transporting fare paying passengers. For the large measure, the airplanes certified under Part 25 do in fact fall into this type of operational category. There are however, other types of businesses that Transport Category Airplanes are created to support that do not use the airplanes as revenue producing assets. Operations such as these may be called 'Private, not-for-hire' and as such, may have such an interior configuration that certain of the Part 25 Rules may impose restrictions on the design that are inconsistent with the envisioned operation of the airplane under FAR Part 91 or FAR Part 125. An exemption from certain requirements of FAR Part 25 for these airplanes that are not for service to the general public is considered to be reasonable when not involved in common carriage, and when operated under FAR Part 91 or FAR Part 125.

"Transport Category Airplanes intended for private use, have the following common features which encourage special consideration for unique certification requirements.

"1. Operation is limited to private use by an individual, a company, or a government and does not include a public passenger or cargo for-hire commercial service.

"2. In most cases the passenger configuration of the airplane is less than 30% of that of a traditional commercial airline configuration (and in the case of wide-body airplanes, may be less than 20% of the maximum certified capacity).

"3. Flight and cabin crews are intimately familiar with the particular configuration of the airplane, the interior arrangement, emergency equipment provided, and the location and operation of the emergency exits. This is as opposed to those cases possible in a commercial airline where many different types of airplanes may be in use by a single operator, and many different interior configurations of a single airplane type may be operated by a single airline.

"4. Owner preference and requirements for custom features such as layout, materials, fabrics, fixtures, and finishes is a major driving force behind the marketability of these type of airplanes.

"5. Owner desired privacy areas on the airplane dictate the use of compartments such as board rooms, bedrooms, lavatories, and lounges rather than traditional airline type seating arrangements featuring enclosed lavatories but a wide open cabin. These features combine to create unique, one-of-a-kind interior configurations and the application of many different types of materials.

"Exemptions are requested for the following provisions of FAR Part 25 taking into consideration the use of the aircraft in a private not-for-hire operation. Granting of the exemptions is requested by this petition.

"FAR PART 25.785(h)(2) View of the cabin by a seated attendant.

"The rule states, '1) Near a required floor level emergency exit, except that another location is acceptable if the emergency egress of passengers would be enhanced with that location. A flight attendant seat must be located adjacent to each Type A emergency exit. Other flight attendant seats must be evenly distributed among the required floor level emergency exits to the extent feasible. 2) To the extent possible, without compromising proximity to a required floor level emergency exit, located to provide a direct view of the cabin area for which the flight attendant is responsible.'

"Exemption Requested:

"That the Boeing Model 737-700 IGW, when configured for private use and utilized under operating rules FAR Part 91 or FAR Part 125, be exempted from that part of FAR Part 25.785(h)(2) which requires 'Direct view of the cabin area for which the flight attendant is responsible.'

"Justification

"FAR Part 25.785(h)(2) states in part 'to the extent possible without compromising proximity to a required floor level exit, located to provide a direct view of the cabin area for which the flight attendant is responsible.' The requirements of this paragraph were incorporated into the rules through amendment 25-51 and the amendment was part of the Airworthiness Review Program. Of the comments submitted to the FAA during the NPRM comment period, two commentated that, if galley doors were used as emergency exits, the placement of an attendant seat near the exit, as required in proposed 25.785(h), could preclude compliance with the requirement that the attendant be provided a direct view of the cabin area. To cover this situation, it was suggested that the requirement be conditioned to apply insofar as practicable and without compromising the proximity to required floor level exits. The FAA concurred and further stated in the preamble to the final rule that 'location of the flight attendant seats near the floor level exits in this case is more important than the requirement that the flight attendant have a direct view of the cabin.' The final rule was revised from the NPRM proposal to address this relative importance. As galleys located near floor level exits are an essential part of the operation and interior configuration of a commercial airplane in revenue service, so too are partitions and interior walls, essential to the successful operation and interior configuration of a business airplane in a private, not-for-hire service operation under FAR Part 91 or FAR Part 125. These features may interfere with the flight attendants direct view.

"Passenger Safety Considerations

"Considering the smaller number of occupants in the business, private airplane, usually less than 30% of that of a traditional commercial configuration, and the familiarity of the flight and cabin crews with the specific airplane, its passengers and it's interior arrangement, and the wording of the existing rule that places the emphasis for safety on the proximity of the exit to the attendant over the ability of the attendant to view the cabin area, there should be no degradation in the passenger safety as a result of this requested exemption.

"FAR PART 25.807(d)(7) Establishing a 60 foot minimum distance between adjacent emergency exits. The rule states the following: 'For an airplane that is required to have more than one passenger emergency exit for each side of the fuselage, no passenger emergency exit shall be more than 60 feet from any adjacent passenger emergency exit on the same side of the same deck of the fuselage, as measured parallel to the airplane's longitudinal axis between the nearest exit edges.'

"Exemption Requested:

"That the Boeing Model 737-700 IGW, when configured for private use and utilized under operating rules Part 91 or Part 125 be exempted from FAR Part 25.807(d)(7). Concern over distance between exits arises from managing an evacuation when passengers queue in the fore and aft aisles becomes overly long due to long distances between exits. With the greatly

reduced number of occupants on the subject airplane, the passengers queue will be much shorter than that of an equivalent commercial airplane. Since it is felt that there are sufficient number of exits in close proximity of each other and fewer passengers to evacuate we are requesting an exemption from the 60 foot rule.

"Justification

"Amendment 25-67 established the maximum longitudinal distance between adjacent emergency exits on the same side of the fuselage at 60 feet in order to ensure an opportunity for safe, rapid evacuation of the airplane in the event of an emergency. The concerns that generated this rule making revolved around the following scenario:
"a) The rate at which passengers flow through an emergency exit appears to be a major factor in limiting the rate of passenger evacuation from an airplane.
"b) The restriction in the flow of evacuees at the emergency exit causes a backup of passengers in the longitudinal aisles of the airplane.
"c) At the onset of an emergency evacuation, as the passengers leave their seats and enter the longitudinal aisles leading toward the exits, these aisles fill with passengers extending from the approach-way along the longitudinal aisles to a natural 'split-line' between adjacent emergency exits where passengers, without external motivation, will turn toward the exit they feel is closest
"d) A critical element in a successful emergency evacuation where all possible passengers have an opportunity for safe, rapid evacuation from the airplane, is for the cabin attendant to be at the exits to manage those passengers that are coming toward the exits to ensure that the available exits are 'loaded' as uniformly as possible. This management of the passengers within the cabin is conducted so as to have the last passenger on the ground at any one exit occur at approximately the same moment as the last person reaches the ground from each of the other exits.
"e) As exit separation becomes greater, and the number of passengers entering the aisles between adjacent exits becomes greater, the task of successfully managing the evacuation becomes more difficult

"The preamble to this amendment states that the regulation was issued as an interim action until 'better knowledge permitting development of a specific performance standard becomes available.'

"There are two critical elements that exist for the 737-700 IGW airplane when operation under Part 91 or Part 125 rules in a private, not-for-hire operation justifying an exemption from this paragraph of the regulation. The first element relates to the general purpose for that airplane as a private transport for use by the owner and the owners associates. While it is not possible at this time to specifically define all possible variations in interior arrangement that may be created in support of owner/operators requirements, it is known that many of these variations will include fixed furnishings such as beds or divans mounted against the sidewall of the airplane that will cover and make inaccessible, the over-wing emergency exit locations of the airplane. These exits, mounted closest to the center of gravity of the airplane are in the most favored location for

a comfortable ride and will therefore be in the best location for a bedroom, and office, or other use where comfort is a prime consideration.

"The second element for justification for exemption from this paragraph considers the small numbers of passengers the airplane will carry and the effect of these passengers on the ability of the flight attendant to carry out a rapid, safe evacuation from the airplane in the case of an emergency. The maximum number of passengers aboard the airplane will be fifty, and of those passengers, in most cases, the knowledge of the airplane and its emergency systems will be greater than passengers on board an airplane operated by an airline in revenue service. This is because the occupants will usually be associates of the owner, will fly the same airplane many times, and will have the opportunities to discuss the operation of the airplane with the crew who usually are on a first name basis with the passengers.

"As stated above, when the separation of exits along the fuselage becomes greater, the task of managing a successful evacuation becomes greater, but this increase in difficulty is a function of the number of passengers that fill the longitudinal aisles of the airplane at the onset of the evacuation. For any exit arrangement, there probably exists some maximum and some minimum acceptable distance between exits, and therefore some optimum. The best overall criteria is probably that the exits be adequate in number and in compliance with the rules, and that they be uniformly distributed along the length of the fuselage with exits located near the front and the rear of the fuselage. With a maximum number of fifty passengers, the airplane discussed herein with one pair of floor level exits located at the forward end of the cabin, and a second pair of floor level exits at the aft end of the cabin satisfies that general criteria.

"Passenger Safety Considerations

"Considering the small number of occupants in the business, private airplane, usually less than 30% of that of a traditional commercial configuration, and the familiarity of the flight and cabin crews with the specific airplane, its passengers, and its interior arrangement, and the wording of the existing rule that, 'the minimum number of passenger exits required for 40 through 79 passenger seating configuration is 2 Type 1 and 2 Type III,' the emphasis for safety on the proximity of the exit to the passengers, there should be no degradation in the passenger safety as a result of this requested exemption.

"FAR PART 25.812(e)(1) Providing emergency lighting including floor level proximity escape path lighting.

"The referenced paragraph. Part 25.812(e), requires 'Floor proximity emergency escape path marking must provide emergency evacuation guidance for passengers when all sources of illumination more than four feet above the cabin aisle floor are totally obscured.' Sub paragraph (1) further requires that 'after leaving the passenger seat visually identify the escape path along the cabin aisle floor to the first exits or pair of exits forward and aft of the seat.'

"Exemption Requested

"That the Boeing 737-700 IGW when configured for private, not-for-hire airplanes owned and by an individual, a company, or a government, and operated under FAR Part 91 or 125 be exempted from FAR Part 25.812(e)(1). While it is not intended that this request for exemption be from the basic paragraph, nor from subparagraph (e)(2), for those portions of the subject airplane model where an executive interior is installed including a 'room' type atmosphere, it is requested that this airplane be exempt from the requirements of FAR Part 25.812(e)(1). The only feasible means of certification of this interior configuration is through an exemption process.

"Justification

"In the case of private, not-for-hire airplanes owned by an individual, a company, or a government, and operated under FAR Part 91 or FAR Part 125, a large portion of the cabin may be configured with privacy areas including board rooms, bedrooms, and lounges that do not include what is traditionally termed as longitudinal aisles leading toward airplane exit approaches. These privacy areas may, in fact, include the appearance of a traditional living room in a persons home, or a private office in a commercial building. Due to these drastic configuration differences between this business airplane and the interior of a commercial airliner, the existing regulations do not provide adequate or appropriate criteria for safety standards addressing the unique interior configurations found in a private, business type airplane. Since the regulations do not provide criteria for these room type configurations, an exemption from FAR Part 25.812(e)(1) for these rooms is the only feasible method of certification, leaving FAR Part 25.812(e) and FAR Part 25.812(e)(2) as requirements under which the emergency floor proximity lighting will be certified. The basic provisions of Part 25.812(e) are considered to be appropriate regardless of the interior configuration of the airplane, and would provide guidance for the occupants of a privacy area to visually identify a route from their seat out of the compartment to the closest cabin aisle where escape path illumination is provided.

"Passenger Safety Considerations

"Considering the smaller number of occupants in the business, private airplane, usually less than 30% of that of a traditional commercial configuration, and the familiarity of the flight and cabin crews with the specific airplane and its interior arrangement, and the wording of the existing rule that floor proximity emergency escape path marking must provide emergency evacuation for passengers when all sources of illumination more than 4 feet above the cabin aisle floor are totally obscured and in the dark of the night, the floor proximity emergency escape path marking must enable each passenger to readily identify each exit and the ability to light the cabin area there should be no degradation in the passenger safety as a result of this requested exemption.

"FAR PART 25.813(e) Prohibiting internal cabin doors in emergency access routes
The rule states the following: 'No door may be installed in any partition between passenger compartments.'

"Exemption Requested

"That the Boeing Model 737-700 IGW, when configured for private use and utilized under operating rules FAR Part 91 or FAR Part 125, be exempted from the rule addressing doors between passenger seating areas. These cases were not considered when the rule was promulgated. These private, not-for-hire airplanes include separate areas of privacy for the occupants that can only be described as 'rooms' including surrounding walls and entry doors between the room and other parts of the airplane interior.

"Justification

"In the case of a private, not-for-hire airplane operating under FAR Part 91 or FAR Part 125, by an individual, a company, or a government, a portion of the interior cabin may be configured with privacy areas that are intended to exclude persons not seated within the room from being aware of conversations taking place within the room. Especially in the case of a business where business associates may be accompanying the owner, it is imperative that very private meetings must be accommodated by the facilities and furnishings in the passenger cabin of the airplane. The only conceivable method of providing for such privacy requirements is through the use of separate rooms consisting of walls and doors within the passenger cabin. In almost any imaginable operation of a business airplanes such as this, the requirement for doors between different areas of the airplane are basic and intrinsic to its operation. When a privacy area is created within the passenger cabin, the doors that separate the private area from the rest of the cabin will, by definition be located 'between passenger compartments.'

"For the case of a room covering the total width of the passenger cabin, the doors at the front of the compartment and at the aft end of the compartment would be doors latched open during taxi, takeoff and landing. This would be the requirement whether the compartment is occupied or not. The latch system would be redundant, and the door and the latching system would be designed for crash loads. This configuration allows the room to be a part of the evacuation route between different parts of the cabin.

"For the case of a compartment that does not cover the total width of the passenger cabin and allows occupant access between different areas of the cabin by traversing around the compartment, the door to the compartment would be latched open when the compartment is occupied for taxi, takeoff and landing, and would be latched closed when the compartment is not occupied for taxi, takeoff and landing. The latch system would be redundant and the door and the latching system would be designed for crash loads. This configuration would ensure a viable escape route for occupants of the compartment in the case of emergency, and would preclude passengers from entering the compartment inadvertently during an evacuation should the compartment be empty.

"Passenger Safety Considerations

"Considering the smaller number of occupants in the business, private airplane, usually less than 30% of that of a traditional commercial configuration, and the familiarity of the flight and cabin crews with the specific airplane, and its interior arrangement, and the wording of the existing rule (Part 25.813(f)), if it is necessary to pass through a doorway separating the passenger cabin from other areas to reach any required emergency exit from any passenger seat, the door must have a means to latch it in the open position. The latching means must be able to withstand the loads imposed upon it when the door is subjected to the ultimate inertia forces, relative to the surrounding structure. It is obvious that the escape path not be obstructed by curtains, or doors, however, insuring that the doors be latched in the appropriate direction during taxi, takeoff, and landing in order for the passengers to have an unobstructed path to the emergency exits would place the emphasis for safety on the proximity of the exit to the passenger and the ability of the passenger to view the cabin area. Therefore there would be no degradation in the level of safety by providing an exemption from the rule Part 25.813(e).

"FAR PART 25-853(d) Requiring that cabin materials meet specific flammability standards.

"The rule in Amendment 25-61 states in part that the interior materials (including finishes or decorative surfaces applied to the materials) must meet the applicable test criteria prescribed and the interior components of airplanes must meet the established flammability standards for transport category airplanes with passenger capacities of 20 or more as specified in the test method used in showing compliance with these standards. It also states that using the OSU test apparatus, an average of three or more test specimens must not exceed 65 kilowatts per square meter peak heat release nor 65 kilowatt minutes per square meter total heat release during the first two minutes of sample exposure time (65/65). Using these test methods the evacuation must occur before lethal or non-survivable smoke and fumes fills the cabin from materials that might burn.

"Exemption Requested

"That the Boeing Model 737-700 IGW, when configured for private use and utilized under operating rules FAR Part 91 or FAR Part 125 be exempted from Part 25.853(d) which requires interior components and materials to meet more stringent flammability measures than was previously required under Appendix F of Part 25-813.

"Justification

"At times, the owner of a private airplane will have specific needs for the use of exotic or plush, extremely comfortable materials to be used in the cabin. Usually these materials cannot satisfy the rigid flammability requirements of this paragraph. Compliance will be shown by separating out those materials of an exotic nature and complying with the earlier amendment level in those smaller quantities and show compliance to the newer amendment on the majority of the

passenger compartment such as ceilings, walls, carpet, cabinets, galleys, and other seating areas.

"The purpose of this amendment was to ensure that occupants of an airplane, during an emergency that includes a cabin fire have an opportunity to evacuate the airplane before heat released by the fire or the phenomena known as 'flash-over' causes the environment in the cabin to reach the flash point of the ceiling material. In the case of a private, not-for-hire airplane operating under FAR Part 91 or FAR Part 125, with approximately 30 percent of the number of passengers carried in an equivalent sized airplane in revenue service, (fifty or fewer passengers in a 737-700 IGW) an emergency evacuation of the airplane will occur at times much more representative of a small charter airliner. Because of the lower passenger densities, the lower passenger-to-exit ratios, and the enhanced evacuation rate capability provided by the type of exits installed in the 737-700 airplanes, it is appropriate to apply criteria to this airplane that is more closely associated with airplanes carrying twenty or fewer passengers. The passenger to door ratio will be less than those airplanes envisioned by the rule, and the emergency exits are capable of evacuating more passengers in a short period of time. As illustrated in the graphs, shown in attachment 1, the evacuation of the BBJ airplane occurs in a shorter time, before heat release becomes critical. The evacuation times shown in the graphs are based on estimated data, particularly for the BBJ. For illustrative purposes, the heat release curve for the BBJ is double that for the airliner, but still the BBJ evacuation is complete before total heat release becomes critical. We therefore request an exemption from this rule, because the passenger will have evacuated before the environment becomes lethal, or non-survivable and the smoke could overcome the passengers.

"Passenger Safety Considerations

"Considering the smaller number of occupants in the business, private airplane, usually less than 30% of that of a traditional commercial configuration, and the familiarity of the flight and cabin crews with the specific airplane, and its interior arrangement there should be no degradation in passenger safety. Also consider that the flammability requirements were based on evacuation of the aircraft by a larger number of passengers within 90 seconds, the smaller number of passengers would be able to evacuate the aircraft in less time thus, before the cabin became unsafe from lethal or non-survivable smoke and fumes the passengers could be safely evacuated from the aircraft."

A summary of the petition for exemption was published in the Federal Register on July 2, 1998 (63 FR 36284). Twenty four commenters responded to the notice. All of the commenters were either prospective modifiers or customers for the Boeing 737-700 Increased Gross Weight airplane, who strongly supported the petition. These commenters, in addition to repeating the arguments presented by the petitioner, cite the economic benefits and the potential for inequitable treatment between foreign and domestic applicants if the petition is not granted. The FAA is very aware of the potential for different standards to be applied by different regulatory authorities. However, depending upon the country of registry and type design approval, any authority may exempt requirements as they see fit. For airplanes

with a U.S. certificate of airworthiness, the requirements will be applied in the same manner, regardless of the manufacturer. While this does not account for differences in certification bases, it does ensure that the same standards for obtaining approval are required. For airplanes registered outside the United States, the FAA cannot control the modifications performed, but presumably, exemptions by the local authority would be offered on the basis of need, and not original manufacturer. In that case, there would be no advantage to foreign manufacturers. With respect to certification basis, upgrades in certification requirements are necessary to advance safety.

The FAA's analysis/summary is as follows:

The FAA is giving great attention to the issue of transport category airplanes operated in private use. There are several regulatory requirements, including some of those identified by the petitioner, that lend themselves to consideration for modification when looking at the differences between commercial and private use operations. The FAA intends to summarize its views on these regulations and, ultimately, propose modifications to the requirements, where appropriate. It may be that the regulations that are the subject of this petition are included in the proposed modifications, and that additional design flexibility can be offered, when certain circumstances are met. This issue is not resolved at this time, however, and the particular airplane in question must be addressed on its own merits.

While it is true that the major impetus for most of the requirements referenced in this petition is commercial use, it is incumbent upon the FAA to upgrade design safety as the state of the art progresses, irrespective of the type of operation.

The FAA notes that the differences in operation summarized by the petitioner are qualified as "typically" and "generally," and so are evidently not exclusively limited to the restrictions noted. The FAA believes that any reliance on such restrictions would have to be based on them being strictly adhered to. This includes passenger capacity restrictions, where appropriate. This partial grant of exemption effectively imposes such restrictions by means of condition 7, discussed below.

The FAA will discuss each of the petitioner's requests in the order presented.

Direct View

The petitioner has identified the requirement for flight attendant seats to be located to provide a direct view of the passenger cabin as not practical for compliance with the executive type interior to be used on the 737-700. The complexity of the interior arrangement, coupled with the need to retain proximity to emergency exits is cited as the primary reason that compliance is impractical.

The FAA has considered the requirement for direct view in the context of private use airplanes, and agrees that much of the justification for the requirement is based on air carrier type

operations. The practicality of locating flight attendant seats near emergency exits so that there is a direct view of occupants inside of rooms is questionable, at best. In this regard, the FAA does believe that some relief may be appropriate for airplanes intended for private use. The FAA notes that the justification for the requirement for direct view is not limited to observation of passengers that are not familiar with the interior, however. Flight attendant seats should be located so that there is a direct view provided for the cabin area that is practical. Flight attendant seats should not face away from the cabin, for example. In those areas of the airplane where traditional seating arrangements are used, the FAA believes that direct view should be provided.

In considering the need for direct view, the FAA agrees that the restricted nature of the operation of a private use airplane mitigates much of the need. That is, the operator has control of, and can restrict, the population of passengers, unlike an air carrier. The risk of passengers engaging in hazardous or malicious activity is essentially eliminated, and the need for direct view is limited to those cases where a passenger might need assistance. We consider that this objective is met by requiring that a majority of flight attendants seats face the cabin.

Distance Between Exits

The FAA is also considering the issue of distance between exits as part of its overall review of private use airplanes. Amendment 25-67 was adopted in order to establish quantitative limits on the distance that could exist between passenger exits, and to address what appeared to be a trend of increasing distance between exits. As noted in the petitioner's supporting information, the FAA intended that the quantitative limit could be replaced with a performance standard at some point in the future. However, no such performance standard has been forthcoming.

One of the reasons that no performance standard has been developed is that the issue of distance between exits is complex. As stated in the preamble to the regulation, a simple evacuation demonstration does not address the potential concerns arising from excessive distance between exits. Issues such as disruption of interior features, debris in the aisle, or failure of another exit are not addressed in evacuation demonstrations. These issues are magnified the greater the distance between exits, and are not necessarily only related to high density seating arrangements. Therefore, the outcome of the 90 second evacuation demonstration in accordance with § 25.803 of the FAR is not relevant to the disposition of the petition. Similarly, the provisions cited by the petitioner relating to exit deactivation and alternate exit configurations are limited to those particular aspects of the requirements, but do not, in any way, relieve the requirement for adjacent exits to be within sixty feet of each other.

That is, the further the exits are apart, the higher the probability that an *individual* would not be able to get from one exit area to another in an actual accident. In an evacuation demonstration, the time it takes an individual to get from one part of the cabin to another is primarily related to the number of passengers between that person and the area he or she is trying to reach. When the cabin is relatively empty, these times are very short; this may not be the case in an actual

accident, where the scenario is much less predictable. Therefore, contrary to the argument put forth by the petitioner, the fact that the seating arrangement for this airplane is of low density is not, in and of itself, sufficient justification for granting an exemption.

As noted by the petitioner, there are two main differences between this airplane and a typical 737 for commercial operation. First, the airplane in question is not to be operated in commercial service. It is intended for private use, and not for carriage of persons for hire. Second, the passenger capacity permitted by the available exits will greatly exceed the actual number of seats on the airplane.

For the first consideration, the FAA acknowledges that the persons flying on the airplane will not be fare-paying passengers, and therefore might not expect an equivalent level of safety to that afforded in commercial operation. Such passengers must be afforded an adequate level of safety however, so the status of the passengers is not entirely relevant to determine whether an exemption should be granted.

Regarding the second point, as noted above, the number of passengers is not the paramount concern when addressing the distance between exits, although it is relevant in determining the type and number of exits required. It is this point that the FAA has considered further in making its determination.

The FAA notes that it is only the deactivation of the type III overwing exits that necessitates an exemption from the regulations. That is, either the forward or aft pair of type I exits could be deactivated and the airplane would still be in compliance with the regulations. In that case the evacuation capability of the airplane would be diminished over what is proposed, but would be in compliance. Nonetheless, the type III exits are probably the easiest exit type to accommodate in an interior arrangement and the FAA considers that this should be the first option when designing the interior. In fact, all arrangements for the Boeing 737-700 IGW that the FAA has seen to date do retain the type III exits.

In those cases where it is not feasible to retain the type III exits, the FAA considers that there may be acceptable procedures and limitations to allow an exit to exit distance of greater than sixty feet. However, these limitations have not been finally developed for the general case. Since the petitioner has not proposed specific arrangements where exemption from the sixty foot rule is necessary, the FAA is unable to grant exemption from that requirement at this time. This issue is part of the FAA's larger effort to address private use airplanes, however, and the FAA will entertain subsequent proposals for exemption, depending on the outcome of that effort.

Floor Proximity Escape Path Marking

The petitioner has also requested exemption from the requirements for floor proximity escape path marking, as they relate to identification of the escape path along the cabin aisle floor, inside of rooms. The requirement to be able to visually identify the exits when light sources above four feet are obscured would be retained.

The FAA understands the difficulty in marking a "path" inside of a room, when there may be more than one specific path out of the room, depending upon the location of the passenger. In this case, the traditional path is not provided, and therefore cannot be marked in the traditional manner. Considering that this approach is limited to rooms, and would not affect occupants of the airplane in general, the FAA believes that an alternate means of compliance is appropriate. However, the FAA does not believe that the occupants of rooms should be without floor proximity escape path marking. In prior discussions with both the petitioner and potential modifiers of the 737-700 IGW, the FAA understands that the intent of the requirement will be met. Therefore, an exemption is not necessary in this case, as the proposal really only results in a means of compliance different from that normally used in air carrier arrangements, which the FAA can accept under the existing regulations. The FAA would expect that there would be markings at the exit to the room, and elsewhere sufficient for a person to locate that exit.

Interior Doors

As noted by the petitioner, the regulations regarding interior doors did not necessarily consider "rooms" when they were adopted. Nonetheless, the concerns with the doors that were the target of the regulation, (namely, the potential to obstruct access to emergency exits as well as creating a potential for lack of recognition of exits beyond the door) apply to other types of doors as well. In fact, the current regulations do allow the installation of interior doors, provided passengers are not seated on both sides of the door for takeoff and landing. The FAA is concerned that doors not be located between passengers and exits, and has proposed to prohibit such installations in the future in Notice of Proposed Rulemaking 96-9.

The petitioner's discussion of the adequacy of the structural requirements to assure that a properly positioned door, will remain in position following a minor crash landing accurately summarizes the requirements. Clearly, since the regulations currently allow the installation of some doors under these provisions, they are considered adequate. Jamming of doors, however, is not limited to doors that have been properly positioned. Neither does it exclude the potential for the door to jam before it can be properly positioned (due to mechanical failure, for example). The doors envisioned by the current regulations are more limited, more likely to be under direct crewmember control, and thus not as subject to these concerns.

With respect to the possibility that a door will remain closed when it should not be, the FAA believes that a higher level of awareness is required to address this issue. Due to the relative complexity of the cabin interior, the FAA does not believe that inspection by flight attendants prior to takeoff and landing is sufficient to verify that interior doors are in their proper position. Consequently, some type of remote indication is considered necessary; the petitioner's proposal to provide remote indication to the flight crew is considered adequate.

With respect to the integrity of the means used to latch doors open for takeoff and landing, the FAA considers that redundant means are necessary, as proposed. Each latching means should have the capability of retaining the door in the takeoff and landing position under the inertia forces of § 25.561. In addition, the FAA believes that the door must be frangible, in the event that it is closed, or closes during an emergency landing. Frangibility may be demonstrated in accordance with the criteria set forth in Advisory Circular 25-17, paragraph 43.b(2).

As noted above, the FAA does not consider that all interior doors are equivalent. In the case of doors that open into rooms, for which only the occupants of the rooms must use the door to reach an exit, the FAA believes that there is a potentially acceptable installation. The FAA is not ready to entertain doors between passenger compartments that must be used by other persons to reach an emergency exit. In this case, rooms that span the width of the cabin with exits beyond the room could not have doors. However, doors could be installed on certain of the rooms along the side of the fuselage, or rooms at the ends of cabins where there are no exits. For the purposes of this exemption, "passenger compartment" refers to compartments occupied for taxi, takeoff or landing. Compartments that are only occupied in flight are permitted to have doors under the existing regulations, provided that such a compartment is itself not located between passenger compartments.

Interior Materials

With respect to the flammability of interior materials, the petitioner has accurately summarized the requirements. The petitioner correctly notes that the requirements are related to prolonging the time available for evacuation. The petitioner has also included theoretical graphical information plotting evacuation time versus material flammability for a typical commercial arrangement and the type of arrangement envisioned for the private use 737-700 IGW. These data show that the latter airplane can have greater evacuation capability, and essentially not require the improved materials. The FAA notes that these graphs are hypothetical, and not based on empirical data.

In promulgating the rulemaking, the FAA did incorporate a discriminant based on passenger capacity, that was intended to address smaller airplanes, where the ratio of exits to passengers is typically quite good, and where the evacuation times are expected to be quite low. Under these conditions, the benefits of improved materials were expected to be negligible. The airplane type discussed in the petition was not envisioned by the rulemaking, insofar as the large size with low passenger count is concerned. The FAA has considered the issue of the

evacuation capability of the airplane relative to the flammability of the materials and believes that there may be some relief possible. However, the issue of flammability is not limited to post-crash scenarios, and the inflight fire threat must also be addressed. The FAA notes that the petitioner has not proposed an alternative heat release or smoke emission criteria, but rather an exemption from the requirement to assess the heat release and smoke emissions of certain materials altogether.

Since the main benefit of improved interior materials is to lengthen the time available for evacuation, an arrangement that effectively provides the same evacuation capability would satisfy much of the concerns addressed by the requirement, albeit indirectly. The FAA has reviewed the full-scale fire test data used to develop the heat release requirements, as well as considered accident data relevant to this issue. This review is not complete, but it does suggest that a quantifiable improvement in evacuation capability could warrant a relaxation of the heat release requirements. The FAA notes that the petitioner's estimate of the improvement in evacuation time offered by the reduced passenger capacity relative to the exit arrangement is, in fact, only marginally lower than that actually demonstrated during the original type certification, with a maximum passenger capacity. The FAA does not consider this adequate. In reviewing the data developed to date, the FAA considers that a one minute improvement in evacuation time over that allowed by the regulation would be required to relax the heat release and smoke emissions standards. That is, the actual passenger arrangement and exit configuration would have to show an evacuation capability of 30 seconds. The one minute improvement in evacuation time correlates with the benefits derived from the improved materials for the post crash scenario.

The remaining issue of the inflight fire scenario needs to be addressed as well. The major issue with respect to inflight fires is timely recognition. On some airplanes, the interior includes isolated areas, that do not lend themselves to timely detection of a fire. For the purposes of this exemption, an isolated passenger compartment is defined as a room that does not contain an egress path (e.g., main cabin aisle, crossaisle or passageway), or is isolated by a door. In order to address the inflight case, the FAA believes that installation of a smoke detector in such areas would compensate for the potential for an increased inflight fire threat. Therefore, each isolated passenger compartment must incorporate a fire detection system that meets the requirements of § 25.858. While this section is written for cargo compartment fire detection systems, the criteria contained therein are considered appropriate to this application.

In consideration of the foregoing, I find that a partial grant of exemption is in the pubic interest and will not adversely affect he level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. 40113 and 44701, delegated to me by the Administrator (14 CFR § 11.53), the petition of Boeing Commercial Airplane Group for an exemption from the requirements of § 25.807(d)(7) is denied. The FAA has determined that an exemption from the requirements of § 25.812(e)(1) is not necessary. The petition for exemption from the requirements of §§ 25.785(h)(2), 25.813(e), and 25.853 (d) to allow the installation of flight attendant seats that do not provide direct view of the cabin, to allow installation of interior doors between passenger compartments, and to install

interior materials that do not comply with heat release and smoke emissions requirements on the Boeing 737-700 IGW airplane, is hereby granted, with the following provisions:

1. The airplane is not operated for hire, or offered for common carriage.

2. A majority of flight attendant seats must be oriented to face the passenger cabin.

3. No door may be installed in a compartment such that persons, other than occupants of the compartment, would have to pass through that door to reach an emergency exit.

4. Each door between passenger compartments must have a means to signal to the flight crew when the door is closed. Appropriate procedures/limitations to ensure that takeoff and landing is prohibited, when such compartments are occupied and the door is closed, must be established.

5. Each door between passenger compartments must have dual means to retain it in the open position, each of which are capable of reacting the inertia loads specified in § 25.561 of the FAR.

6. Each door between passenger compartments must be frangible.

7. The airplane must be shown to be capable of being evacuated in 30 seconds or less, under the conditions described in part 25, Appendix J.

8. There must be means, that meets the requirements of § 25.858(a)-(d), to signal the flight crew in the event of a fire in any isolated passenger compartment (as defined above).

Issued in Renton, Washington, on October 5, 1998

/s/ /Darrell M. Pederson
Darrell M. Pederson
Acting Manager
Transport Airplane Directorate
Aircraft Certification Service, ANM-100